Coherent Electron Cooling Proof of Principle Beamline

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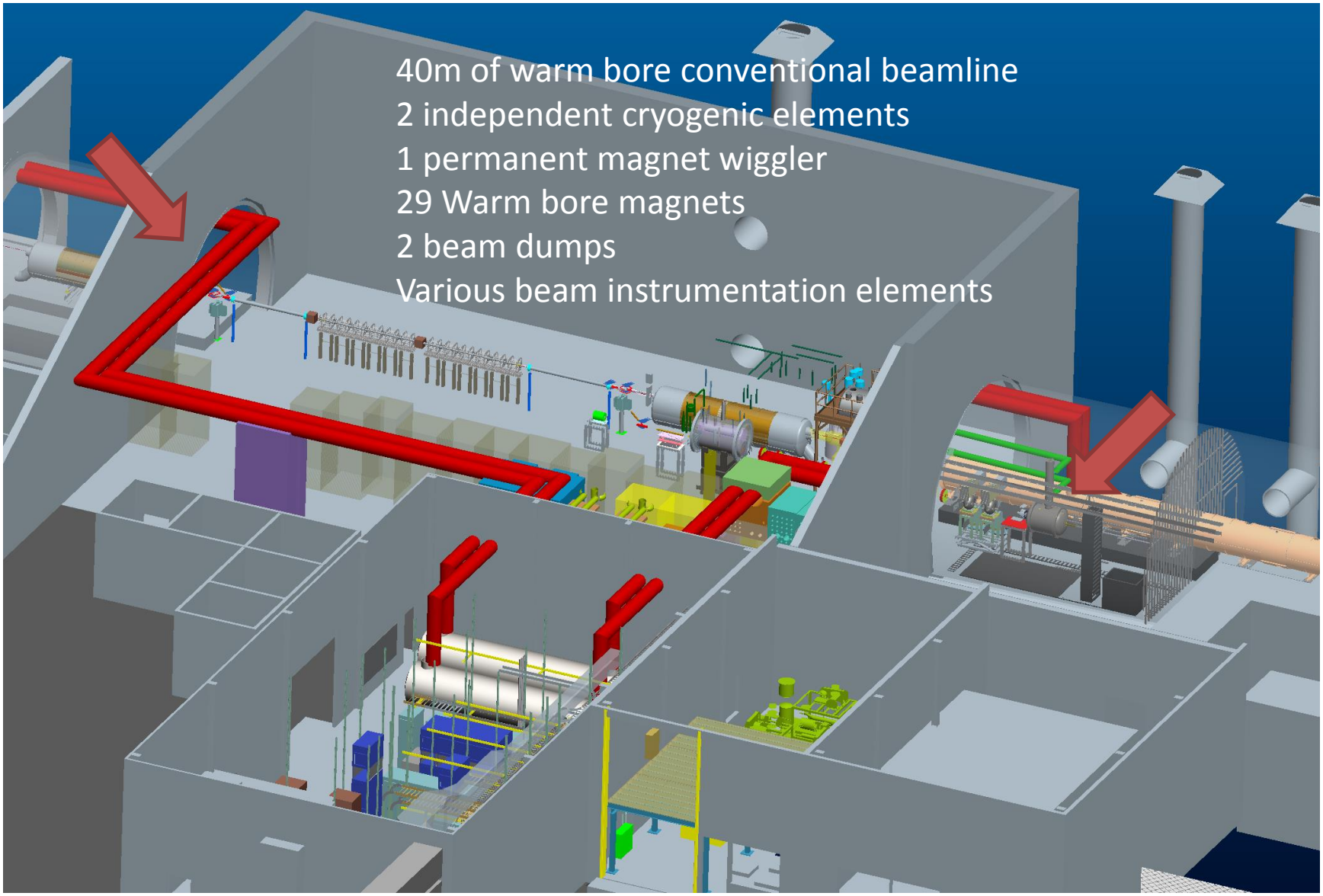
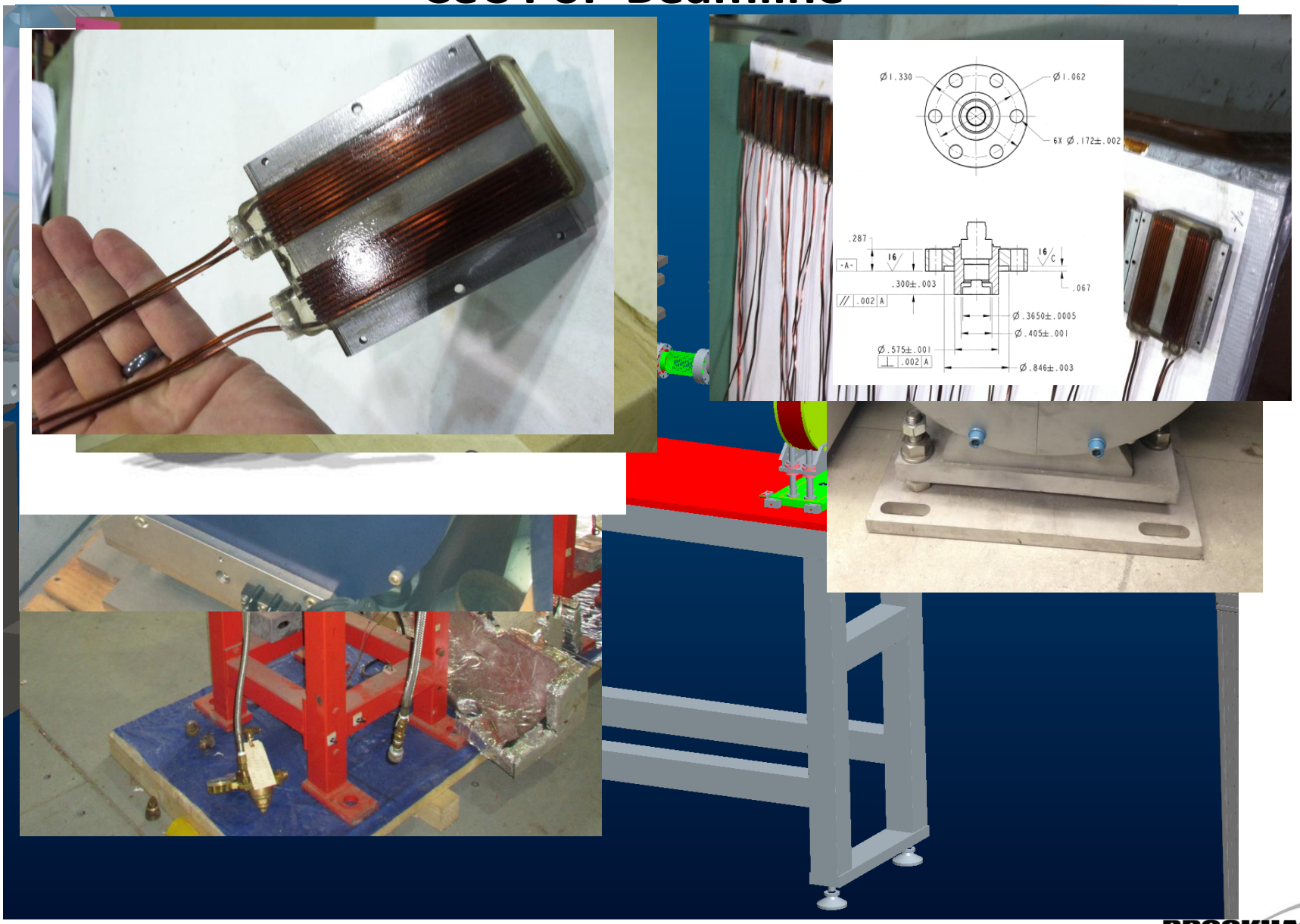
CeC PoP Beamline

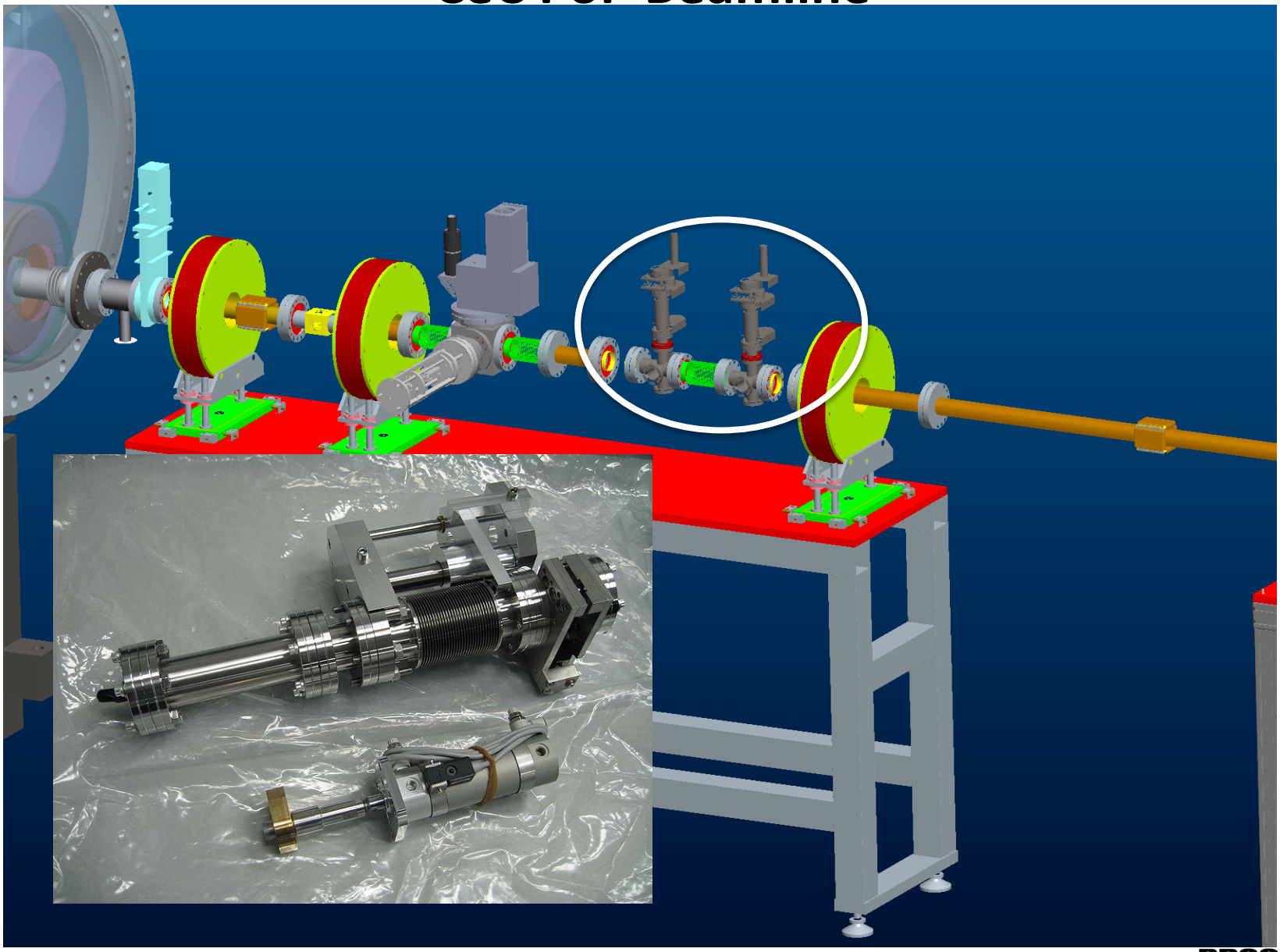


CeC PoP Beamline



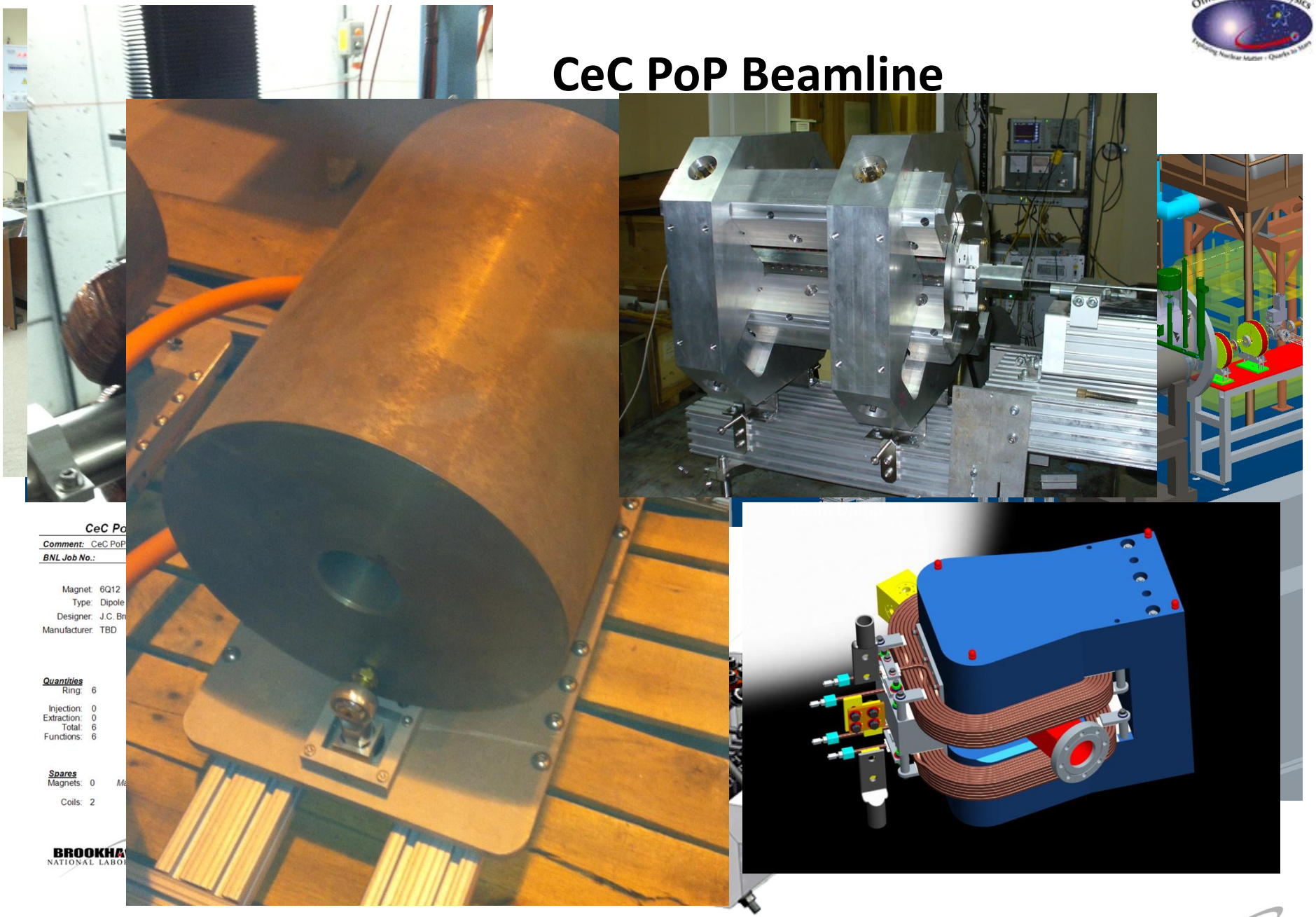
Coherent electron *Cooling* PoP

CeC PoP Beamline



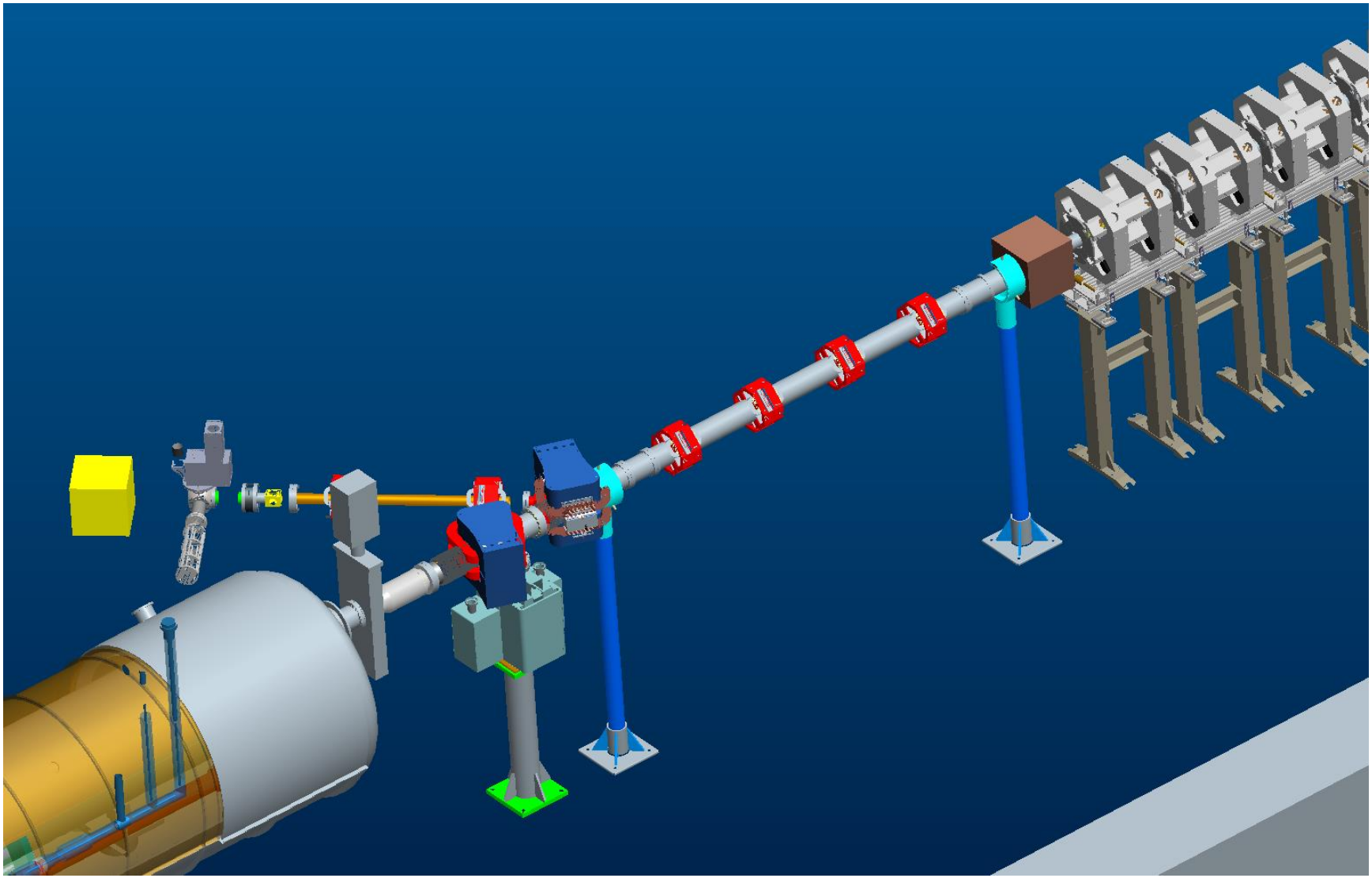
Coherent electron *Cooling* PoP

CeC PoP Beamline



Coherent electron *Cooling* PoP

CeC PoP Beamline



CeC Experiment Review

500 Mhz CAVITY VACUUM PROCESSING

RF WINDOW BEFORE

RF WINDOW AFTER CLEANING

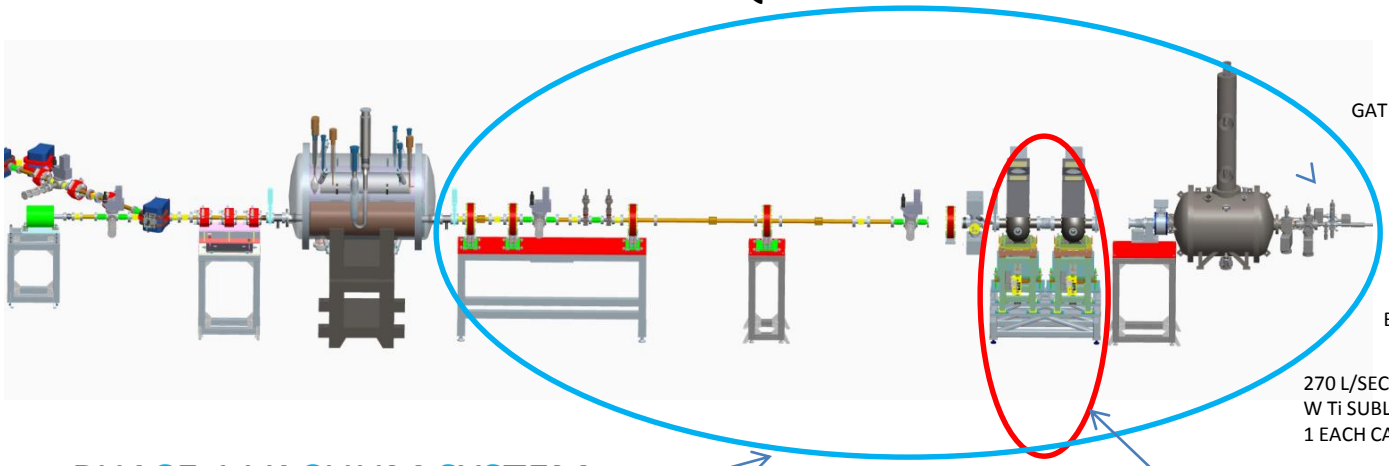
- CAVITIES RECEIVED WITH NUMEROUS WATER JACKET LEAKS
- INSIDE VACUUM SURFACE DIRTY AND BADLY OXIDIZED

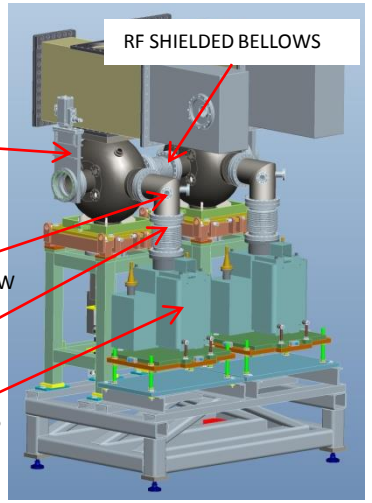
PARTICULATE FREE PROCESSING OF BEAMLINE COMPONENTS AND VACUUM CHAMBERS IS NECESSARY TO PREVENT DEGRADATION OF SRF CAVITY Q FACTOR

- WATER JACKET LEAKS REPAIRED
- TUNERS BEING REBUILT
- REQUIRED COMPLETE DIASEMBLY FOR CLEANING
- CAVITIES CHEMICALLY CLEANED AND IN CLASS 100 CLEANROOM
- UNDERGOING BLOWDOWN FOR PARTICULATE FREE PROCESSING

CeC PoP Beamline

VACUUM SYSTEM EQUIPMENT INSTALLATION BY PHASE



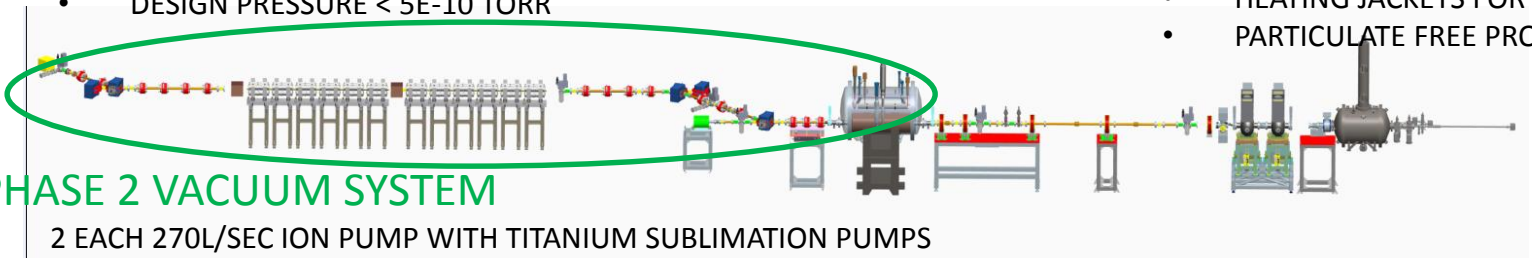


PHASE 1 VACUUM SYSTEM

- ION PUMPS WITH Ti CARTRIDGES
- RF SHIELDED BELLOWS
- GATE VALVES
- COLD CATHODE /TC GAUGE SET EACH CAVITY AND BEAMLINE
- HEATING JACKETS FOR 150^{O} C INSITU BAKE
- PARTICULATE FREE PROCESSING
- DESIGN PRESSURE < 5E-10 TORR

PHASE 0 VACUUM SYSTEM

- 270L/SEC ION PUMP WITH TITANIUM SUBLIMATION/EACH CAVITY
- RF SHIELDED BELLOWS
- GATE VALVES
- COLD CATHODE /TC GAUGE SET EACH CAVITY
- HEATING JACKETS FOR 150^{O} C INSITU BAKE
- PARTICULATE FREE PROCESSING



PHASE 2 VACUUM SYSTEM

- 2 EACH 270L/SEC ION PUMP WITH TITANIUM SUBLIMATION PUMPS
- NEG COATED BEAMPIPE
- RF SHIELDED BELLOWS
- RF SHIELDED GATE VALVES
- 2 EACH COLD CATHODE /TC GAUGE SET
- HEATING JACKETS FOR 250 ^{O} C INSITU BAKE AND NEG ACTIVATION
- DESIGN PRESSURE 10e-11 TORR

INTERFACE WITH EXSITING RHIC VACUUM I&C SYSTEM

Power Supply Configuration and Requirements

- The five main dipole magnets are connected in series. All other magnets / windings are individually connected.
- The quad trim windings are configured as either horizontal or vertical correctors.
- There are a total of 48 power supplies – all controlled via Ethernet.

Power Supply Requirements				
Function	**Qty**	**I, Amps**	**V, Volts**	**Stability**
Main Dipole	1	167	30	± 100 ppm
Quads	16	10	20	± 50 ppm
Large Solenoid	1	10	40	± 50 ppm
Small Solenoid	5	10	40	± 100 ppm
Correctors	6	± 5	± 10	± 100 ppm
Dipole & Quad Trims	19	± 1	± 20	± 100 ppm

Bob Lambiase

Small Supply (<=10 Amps) Implementation

- All small supplies are versions of the CAENels model SY3634. This unit was initially designed at Elettra. The engineer for the power part now works at CAENels.
- There are four bipolar regulators and a control power module in a 3U crate. The bulk supply is external.
- Ethernet interface is common to all small supplies and similar to larger main dipole supply.

Some Specifications	
Set Point	15 bits
Read-Back	20 bits
Current Ripple	30 ppm / FS
Output Current Stability	50 ppm / FS
Accuracy	0.05%

Bob Lambiase

Main Dipole PS (170 Amps) Implementation

- The proposed unit is CAENels DiRAC model PS170030. The DiRAC models are 6kW unipolar converters.
- The unit is air cooled, and housed in a 3U rack mountable chassis.
- A free-wheeling diode is internal.

Some Specifications	
Set Point	18 bits
Read-Back	20 bits
Current Ripple (0-10kHz)	100 ppm / FS
Output Current Stability (8 hr)	20 ppm / FS
Accuracy	0.1%

Bob Lambiase